

WHAT IS CLAIMED IS:

1. A fiber-optic tunable filter, comprising:
 - a fiber having a polished surface and an evanescent-field; and
 - a photonic crystal material attached to said polished surface and having a photonic band-gap, wherein said photonic band-gap is adjusted to reflect a specific wavelength returning to said fiber.
2. The fiber-optic tunable filter according to claim 1, wherein said polished surface is fabricated by one of a polishing method and a laser-paring method.
3. The fiber-optic tunable filter according to claim 1, wherein said photonic crystal material further has plural cavities and a filler filled in said plural cavities.
4. The fiber-optic tunable filter according to claim 3, wherein said filler is an EO (Electro-Optic) polymer.
5. The fiber-optic tunable filter according to claim 3, wherein said photonic band-gap is adjusted by one of a volume and a refractive index of said filler.
6. The fiber-optic tunable filter according to claim 3, wherein said plural cavities is arranged in one of a periodic manner and an aperiodic manner.
7. The fiber-optic tunable filter according to claim 6, wherein said plurality of cavities arranged in a periodic manner is parallel to a core of said fiber.
8. The fiber-optic tunable filter according to claim 6, wherein said plural cavities arranged in a periodic manner is perpendicular to a core of said fiber.
9. The fiber-optic tunable filter according to claim 5, wherein said volume of said filler is adjusted by one selected from a group consisting of a thermo-optic effect, a piezo-electric effect and an acousto-optic effect.
10. The fiber-optic tunable filter according to claim 5, wherein said refractive index of said filler is adjusted by one selected from a group consisting of a

electro-optic effect, a thermo-optic effect, an acousto-optic effect and an optical nonlinear effect.

11. The fiber-optic tunable filter according to claim 1, wherein said photonic band-gap is one of a complete photonic band-gap and an incomplete photonic band-gap.

12. An optical intensity modulator, comprising: /

a fiber having a polished surface and an evanescent-field; and

a photonic crystal material attached to said polished surface and having a photonic band-gap, wherein said photonic band-gap is adjusted to control a path of a specific wavelength in said evanescent-field when said evanescent-field is penetrated at said polished surface to contact said photonic crystal.